MENTAL HYGIENE PROBLEMS, PSYCHIATRY AND THE GENERAL PRACTITIONER*

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THIS paper is written to advance the opinion that practitioners of medicine, other than neuropsychiatrists, have repeated opportunity to prevent the development of mental disorders through proper recognition of them in their incipiency, when they are simple mental hygiene problems in childhood. Much has been written on this subject, but repetition is obviously necessary to bring results.

Until late years, instruction in neuropsychiatry has been generally inadequate and medical students have grown into practitioners of medicine with but a vague concept of the subject. The anatomy and function of the central nervous system are complex and a comprehensive and practicable understanding of mental processes is not easy to attain. While there has been a tendency to relegate the treatment of fully developed mental disorders to specialists, there has been a woeful lack of recognition of mental danger signals in childhood and a consequent failure to refer children with potential abnormal mental trends to some experienced person for proper treatment. Thus psychoses develop that could have been prevented and, when the patient eventually comes to the specialist, the mental situation may then be such that beneficial results from treatment are difficult or impossible to attain. There has resulted the double tendency to regard mental disorders as nonunderstandable and noncurable. Such concepts are ill founded; certainly, however, psychoses are more easily prevented than cured.

The trained psychiatrist repeatedly sees avoidable psychotic outgrowths from mental trends that had their origin in early childhood. Probably there would still be psychotic upsets, were all children under the most expert supervision. The fact remains that childhood is the time when one can best influence mental trends and that an ounce of prevention in childhood is worth a pound of cure later.

Since one grasps the intricacies of the mind with one's own mind, perhaps, with all our knowledge, we lack complete understanding of the subject. Yet, on the whole, we have fair understanding and there is a fair possibility of moulding the impressionable, imitative child to fit well into the scheme of things.

DEVELOPMENT OF ANATOMICAL STRUCTURE

Suppose that, at one time on earth, there had been no animal life; that it first appeared in the form of a unicellular organism and that, in the course of a very great period of time, it gradually became more complex. From a stage of unicellular organisms, multicellular organisms developed; then the execution of special functions by special groups of cells; then more and more such groups until animal life reached the stage in which we see it today. From the gastreae came the worms. From one branch of the worms came the fish. The fish in the course of millions of years became man. The evolution took place possibly by these stages: bacteria, gastreae, worms, fishes, amphibia, reptiles, marsupials, apes, manlike apes and man.

In studying anatomical structure, one sees evidence of stages in development. There are residuals of structure and function that had to do with adaptation to special environments in the past but which, through changes in environment, are no longer useful to animal economy and which, notwithstanding the lapse of very great periods of time, so slowly are they modified, have not yet completely disappeared. In other instances, all traces of structure and function have long since disappeared after their need had ended. One sees in the anatomical structure of the brain evidence of growth here, less marked development there, as need for special function increased, or was not required. Indeed, the only satisfactory method of gaining an understanding of the distorted, intricate tracts of the central nervous system is to study the various stages of evolutionary development. Various stages of development in the past are manifest in the embryo. It would be difficult to predict, from examination of the human embryo at certain stages, just what the matured growth would eventually be, fish or man. The embryo becomes a fish again, before it becomes man. Gill slits appear and the extremities are in the rounded form of fins. The embryo of the whale at one period shows the developmental stage of teeth which are, however, not present at birth or in extra-uterine life. Teeth were at one time in the past a part of the whale's needed equipment, while now the strong tongue and hard rubber palate suffice. We continue in process of anatomical and functional change; structure and function useful to us now may later be useless and gradually disappear.

EVOLUTION OF FUNCTION OF MIND

The function of the mind has gone through evolutionary change and shall so continue in the future. One has in the mind (in the function of the brain cells) still the influence of conditions of environment that have largely or altogether ceased to exist, as well as of environment that continues in the present. Mental adaptations that were a part of the reactions to the environment millions of years ago, are perhaps now no longer needed. Mental traits and trends that were at one time natural to the environment, are perhaps now not natural and may even be incompatible with the environment. Man, the gregarious animal, has fitted himself more and more into the herd, into a coöperative civilization, with the repression of certain traits and the development of others for the benefit of himself, and of

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civilization—the most advantageous situation for his safety, comfort and progress.

Civilization is a recent development compared to the great length of time that animal life has been in existence. Civilization is but a shell covering underlying traits and trends that hold over from ancestors of the remote past. It is still rather easily punctured, permitting primitive underlying trends to assert themselves—witness behavior in mobs and war. To understand the child, one must take into account the influence of environment in the past from the beginning of animal life. Trends that we inherit developed from the influence of environment in which our ancestors lived. Through environment certain trends have been strengthened and accentuated while others have been weakened and diminished. Mental reactions have been "conditioned" by environment. They were handed down to us without any choice of our own but dependent upon the experiences of our race and ancestral stock. From the beginning of animal life environment has had its influence in the evolution of the mind; it is so at present and will continue so in the future. The more we have needed certain traits, the stronger they have developed and the more pronouncedly we inherit them. A very great length of time is required to develop inheritable structures and functions and trends, and a very great length of time is required for them to cease to function and to disappear after we no longer need them. Obviously, we cannot know all about our development in the past and so, obviously, we cannot know all about what we actually inherit. Yet we can draw some conclusive theories and know some facts.

HEREDITY

We inherit especially the old fundamental characters of the species. The union of the best stock in marriage is naturally advisable, in order through the accentuation of advantageous trends to insure the best heredity to our children. Each generation, especially through the union of good stock, has had some more or less minute change in mental trends not existent in preceding generations. The extreme rapidity with which children learn could not be possible were external aids not reinforced by some inherited tendency of the brain. A child's learning is like the wakening of something previously known—like the revival of memory processes. That is, of course, particularly true when the child travels roads new to him but familiar to his ancestors. Particularly true is this in the case of special talent. The belief, however, that we fatalistically are limited in our abilities by the extent of the qualities that we inherit, without taking into account the influence of environment after we arrive in the world, is too pessimistic and narrow. Certainly inherited structure and function are not much modified during the brief span of our lives. Certainly also, we inherit a definite capacity for intelligence which appears not to be much modified during our lifetime. For this reason, perhaps the most important faculty that we can inherit is a good capacity for intelligence. Yet, even with good intelligence, and with the inheritance of good fundamental traits from good stock, we may be poor citizens if our environment, especially during our childhood years, is not favorable. It is clear that environment in early childhood is extremely important in influencing to good or bad adaptation to civilization.

INFLUENCE OF ENVIRONMENT

Immediately upon our arrival in the world, or perhaps even before our arrival, we begin to be influenced by experiences that leave their mark as memories. (The possibility that factors in intrauterine life produce some form of mental impression is not to be regarded as absurd when we consider the repetition of the same environmental influences in the intrauterine life of our ancestors for millions of years. Such impressions must, of course, be looked upon as essentially hereditary in character; and extrauterine influences upon the fetus, not previously experienced, should leave little if any lasting impression. It is conceivable, however, that such factors as the warmth of the mother's body, movements of the body, sounds, etc., should leave some actual memory impression. Certainly, soon after birth, such factors as hunger and satisfaction of hunger, pain and relief of pain, comfort and discomfort, bring out certain reactions in the child. Excluding the most important and fundamental trends of our race, those that become manifest with so little external stimulation, certain environmental influences are ordinarily regarded to be necessary to the establishment of memories. One must be conscious, as probably only the most extraordinary stimuli are at all recognized in a state of unconsciousness. One should not be too fatigued, as fatigue tends to lessen attention and comprehension. Previous experience and the habits of alertness, good attention, good concentration and good apprehension play their part in permitting an impression to so affect the brain cells and their functions that a memory remains. Lack of previous experience renders comprehension more difficult, as do also lack of attention, poor concentration and the habit of poor apprehension. The importance of the experience and resulting interest likewise play their part. But habit is to be looked upon as the keynote of adaptation. Anything repeated over and over a sufficient number of times tends to become a habit. Good habits and bad habits are formed through such repetition. Once a habit has been established, good or bad, it is not so readily overcome as is the influence of an unrepeated experience. One thus forms habits of thought, of conduct, of reaction, of emotional feeling—physical habits and mental habits—biochemical-physiological habits—habits of attention, concentration, interest, alertness, apprehension, comprehension, retentiveness, quick conclusions, organized thought, judgment, or of their opposites. One may be habitually happy or depressed, optimistic or pessimistic, trustful or untrustful, confiding or unconfiding, sociable or unsociable, gregarious or solitary, cyclothymic or even in mood,

stupid or brilliant, quick or slow, witty or lacking in humor, etc., through habit. We must enter the world with certain hereditary habits or tendency to habits, but our personality—the expression of our ego, that which distinguishes an individual from other individuals, as well as those traits that conform with the uniform expression of the herd, of civilization—may be modified one way or the other through environment. While the experiences of our lifetime bring about such minute influence upon our germ plasm that we transmit to our offspring but little modification, at the same time our personality, our adaptations, are greatly modified by our environment and thus, after we have once arrived in the world, our environment becomes to us of utmost importance. We are especially fortunate if we have inherited a high capacity for intelligence, but if a low intelligence we may still, with proper environment, be good citizens. We are fortunate if we have inherited a good physique, organs with good function, a well balanced endocrine system. But if a poor physique, with good environment we may still make a good adaptation. If with inherited tendency to disease, with good environment we can perhaps overcome that tendency. If there has been insanity in our stock and we inherit a tendency to insanity, good environment may well bring about mental soundness and stability. And good environment means essentially whatever is good for our physical and mental health, such as good mental influences and the sort of attitude and direction by those with whom we come in contact that will bring about good habits.

MENTAL HYGIENE IN CHILDHOOD

A great deal has been written on the general subject of mental hygiene of childhood, but there continues to be rather generally a more or less imperfect understanding of the knowledge that is available. Oftentimes there is failure to put into practice what is known. There is the tendency, as long as one makes a relatively good adaptation, to give the possibility of better adaptation little thought. Probably no one carries on at full potentiality. The standards of our civilization are far below what should be a possible maximum; thus there is failure of incentive to better the standards. That fact is in general but imperfectly conceived, or if a fair concept is had, a practicable method of betterment does not readily present itself, or too much effort is required. When one takes into account the prevalence of a degree of intelligence defect sufficient to bring down the average to a strikingly low figure with resulting inhibition in understanding of things at all complex, the lack of broad vision of the state of affairs, the satisfaction with one's degree of adaptation and the lack of initiative to do better, it is not surprising that, of the comparatively few persons that have good comprehension of the situation, only a very exceptionally brilliant member of society propounds a workable scheme for betterment, the execution of which is then more or less impeded through the type of material to which it must apply. The assumption that all men are created equal is not true, except as a matter of man-made law. In consequence, improvement upon our state of civilization is extremely slow.

Further, perhaps without exception, all adults have themselves mental trends that render them more or less blind to certain situations that are obvious to others. "Oh wad some power the giftie gie us, to see oursels as ithers see us." Probably no one has a mind that is completely well ordered. We conceive and comprehend with our mind. Our mind is the sum of what we brought into the world plus the impressions left upon us by our experiences from the time that we were born. Each experience has made a certain impression upon us, more or less enduring dependent upon the degree of receptivity of our minds at the time (degree of attention, interest, alertness, fatigue, intelligence, education, previous experience, etc.) into which usually enters the importance to us of the experience. Such impressions remain with us as memories of the experience. We retain memories consciously or in a state of recall if they are sufficiently important to us, or if they have repeated themselves, or if they are widely associated with other memories. All memories are associated together more or less, and obviously the memory of a certain experience will tend to be recalled as often as we are conscious of some associated memory. Other factors enter into the conscious retention of memories, such as the tendency to retain memories of pleasurable content. Inversely, we tend to forget something with painful content, or something unimportant, or something unrepeated. Further, except for such mental qualities as we bring into the world with us, everything is new to us at the time of our birth. In childhood new experiences crowd into our life. With the exception of something very important to us, they are not readily retained by reason of their large number, the lack of previous experience, the immaturity and lack of good order of our minds and, especially related to the latter, the imperfect development of the habit of good concentration of attention and of retentive memory. Consequently, as adults, we retain but isolated memories of our childhood. Better retention of memory in adult life is dependent upon the habit of good concentration of attention, previous experiences with their associations, better discrimination and judgment bringing about selectiveness of memory, all evolving a habit of better retentive memory. Memories, whether of experiences in childhood or adult life, if not conscious are nevertheless not lost to us. They remain with us, as we can prove by recalling them through association or, even if we fail to recall them, we believe that they are nevertheless within our mind. Furthermore, all the experiences of our life have had more or less influence upon our personality—our manner of meeting our environment. The foundation of our personality then, other than inherited traits and trends, is laid in early childhood and upon that foundation we build, as years go by, our ideas, opinions, reactions and conduct. How important is this foundation! With some defect in it, we

must balance and perhaps repeatedly balance the superstructure.

We ordinarily do not appreciate this. Our ideas, opinions, reactions, conduct, seem to us, as a rule, altogether natural and logical. We ordinarily do not trace them to their original source in the foundation—inherited trends or childhood experiences that we have forgotten. On the contrary, we tend to rationalize them as having to do with perhaps quite unrelated experiences. One is surprised when he finds himself quite in error in certain of his concepts. All this is important to his ego—that which sets him apart as an individual, a personality apart from other personalities—an individual with opinions that satisfy him in his belief that they are right as they seem so natural, so spontaneous and so sensible. Yet he may be quite in error in his deductions and conclusions through faulty premise in childhood, the foundation upon which his conclusions were constructed. By reason of this satisfaction in the correctness of his logic, nearly everyone is ready to express an opinion about things with which he has had inadequate experience and, consequently, of which he cannot have adequate knowledge. Ask the average person his opinion, e. g., about conditions in Russia, and see how readily he gives it, perhaps evolved at the moment without previous thought, and based upon concepts that appear to him to be correct. Put the same question to someone who has had adequate experience and he will perhaps reply that the situation is complex and not readily elucidated. Ofttimes the most opinionated person is one who knows very little about his subject and yet who perhaps does not consciously try to appear well informed. The average person has so well formed an ego, that his opinion about any matter seems to him to be proper and, upon that premise, it would be a wound to his ego not to give his opinion. Much courage is required for one to say that he does not know.

It is difficult for adults to understand the mind of the child when they themselves are restrained from good understanding by reason of certain trends within themselves. Without insight into the fact, they regard themselves as mentally quite capable of proper understanding. The child feeds this tendency through obvious respect for the knowledge of the adult. In reaction to such attitude, the adult elaborates and rationalizes his concepts, often finding himself in deep water but not admitting he is beyond his depth in order to avoid showing the child that he is not all-understanding. Then, too, most adults do not make adequate effort as their ego tells them that, as adults, they should readily understand the mind of the child. They fail to realize that the mind of the child represents not only the memory accumulation of experiences since birth, but also the hereditary accumulation of millions of years. More often the child studies the adult with better success than the adult studies the child.

Were adults more understanding, fewer statements such as "I don't know what to do with Johnny; I never saw anything like him" would be heard. Perhaps the traits in Johnny are but the reflection of similar traits in the adult; the child is an imitative animal and tends to copy his environment. One sees this clearly in the stereotyped imitation by a younger child of the traits of an older one. But one does not so readily realize that the burst of temper may be an imitation of the adult under some more or less similar situation. The fact that the child is like the parent in mental characteristics does not by any means necessarily point to the inheritance of the traits, as these may have been acquired through imitation.

At a very early age, the child has had experiences sufficient in number to form his reactions into habits and he shows certain foundations of personality that distinguish him as an individual. He has his own likes and dislikes, his particular reactions to his environment. These reactions, if allowed to repeat themselves over and over for a long period of time, tend to become more and more established as habits. At first they are easy to modify, to strengthen or overcome. The oftener they are repeated, the greater they grow in strength and the more difficult they are to overcome. Traits that later may be disadvantageous should be recognized as such and modified before they become an integral part of the mental make-up. One should not regard the child merely from the viewpoint of an adult, but should try to get his perspective. One should not look at him with the wrong end of the field glasses. Bad traits should be averted and good ones strengthened. The detail of procedure is to be found in extensive available literature. The child should be helped to develop so great an ability to get along with the world that no possible difficulties in life are sufficient to overcome his powers of adaptation. Thus may psychoses be prevented.

The usual concept of the psychoses as well defined disease entities renders understanding and treatment difficult. A psychosis should be regarded as the sum total of the reaction of the individual, in which heredity, environment and biochemical-physiological processes influence adaptation to the environment. The attempt to fit symptoms into this or that poorly defined disease entity tends to confusion and prevents accomplishment of the best that should be done for the patient. Understanding of mental hygiene problems is more simple and practicable before they become psychoses. Main trends of the personality and trends conflicting with the environment should be carefully studied in childhood by physicians and parents. The pediatrician and internist, the school teacher and social worker, have frequently opportunity to make such observation when parents have observed no occasion to call in the psychiatrist. Thus they have the opportunity to observe potential trends when these are, perhaps, remediable mental hygiene problems. More often than not, these problems have so gained in potentiality, by the time they come to the attention of the psychiatrist, that their modification is difficult or impossible. Early recognition is of the greatest importance in the

attack upon such problems while they are yet vulnerable. It is an important part of the great modern trend to preventive medicine.

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DISCUSSION

NATHANIEL H. BRUSH, M. D. (103 East Micheltorena Street, Santa Barbara).—The keynote of Doctor Myers' very excellent paper strikes me as existing in his statement that the school teacher watching the child's behavior in school has the greatest opportunity of observing the child closely at first hand.

Myers again brings out a very salient point in saying that the parent is often blind to defects which another and disinterested person, observing the child in an entirely impersonal way, could pick up.

A thorough training in mental hygiene should be part of the curriculum of every teacher, and this statement is certainly well borne out by the following experience, which is merely illustrative of countless experiences which neuro-psychiatrists have had in the past, and will have.

A few years ago a young child was brought to the neuropsychiatric clinic of Santa Barbara Cottage Hospital by the school nurse, who reported that the teacher had insisted that there was something wrong with the child, as far as its behavior went. The surprise of the examiner can easily be imagined when, on asking the child the simple question "How old are you, little girl?" because the child was dressed in girl's clothes, had long yellow curls and carried a doll—to receive the indignant reply: "I ain't a girl; I'm a boy." Further questioning brought out the following story from a rather sullen, indignant mother: Her only daughter had died a couple of years previously. Mourning the loss of the daughter, she resolved to rear her youngest son as a girl to take the place of the lost daughter; to this end, she dressed the boy in girl's clothes, endeavored to cultivate girlish traits, forced him to play with girls, and so forth. The mother was so insistent that she be allowed to rear this boy in her own way that only threats to turn the child over to the Juvenile Court sufficed to awaken her to the terrific mistake she was making. She finally acquiesced, and the child was seen two weeks later; this time he had short hair, and upon seeing the examiner, proudly displayed a pair of trousers with pockets in them. Here, the brightness and knowledge of mental hygiene existing in a school teacher saved at least one child from a rather disastrous future.

Another point which Doctor Myers emphasizes is the growing attention paid, in modern medical schools, to the importance of adequate and competent neuropsychiatric instruction, and in at least one medical school no student is eligible for a degree until he has satisfactorily made and completed a certain number of neuropsychiatric examinations upon patients actually observed and studied in the wards of the hospital connected with the school.

All in all, Doctor Myers' paper brings home to us very vividly the importance of the practitioner being able to recognize and assimilate the ever-present problems of mental hygiene and of some slight knowledge of neuropsychiatry.

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H. DOUGLAS EATON, M. D. (1136 West Sixth Street, Los Angeles).—Doctor Myers is to be congratulated on his timely and comprehensive article emphasizing a most important subject. Interest in mental hygiene and fortunately in the mental hygiene of childhood has been steadily developing in the last few years as evidenced by the establishment of clinics for juvenile court cases, child guidance clinics for community service, habit-training clinics in connection with children's hospitals and mental hygiene clinics in schools and colleges as well as in industries. Further education of parents, teachers, pediatricians and general practitioners in mental hygiene will result in earlier and more satisfactory help to the child and consequently greater advantage to the community.

Inheritance is obviously of prime importance in mental hygiene. Those of us who are dealing with psychopathic problems are, I am confident, ready to agree with Plato and ask for a chance to start treatment with the parents long before the child is born. Whatever the inheritance may be, too much stress cannot, in my opinion, be laid on early environmental conditions, both physical and mental. The physical conditions are primarily in the realm of the pediatrician and are being progressively more competently handled. Mental environment conditions, especially personal contacts, the atmosphere created by adults who are themselves poorly adjusted, are frequent causes of maladjustment in children. Many cases have occurred in the writer's experience where the child's disorder could be traced directly and completely to sympathetic absorption from the parent. The child guidance clinic is fundamentally a parent guidance clinic. Fortunately we are making companions of our children to a much greater degree than in the past; a relationship which is, I believe, mutually profitable.

Psychiatrists are now less interested in names and classifications and much more in individual problems. Education along the lines Doctor Myers has so ably suggested will be of tremendous value, not only to the child, but to the parent, the teacher, the physician, and the mental health of the community.

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ROBERT LEWIS RICHARDS, M. D. (384 Post Street, San Francisco).—Mental hygiene from the medical point of view is preventive psychiatry. Doctor Myers has very properly and pointedly reminded the general practitioner that his early efforts may prevent a great deal of the chronic mental illness that at present requires more beds and hospital space than all the physical ailments. The mental hygiene movement has speedily passed from the care of the final disabilities in state hospitals to the origin of these cases as manifested in the home, the school, the church, and the court.

Some main objectives in mental hygiene effort have promptly evidenced themselves:

1. It has always been true that factors of environment are largely modifiable factors, while factors of heredity are modifiable to a very limited degree. You can change the place where a man lives more easily than you can change him or his estimate of values. Eugenic efforts have borne very little fruit, even if they have caused many words and much writing. On the other hand a family attitude or even a national attitude can be radically changed in a comparatively short time (e. g., recent war reactions and changes caused by psychiatric social service nurses). Hence, while mental hygiene favors every effort toward better breeding and better origin of human beings it naturally has attacked first and most vigorously the environment factors in the home, the school, and the court. Consequently it is more interested now in what happens outside state hospitals than inside state hospitals. Mental hygiene is especially interested in the knowledge of preventive mental health facts in the medical profession since the physician has the widest and most human contact beside the parent. This means personality origin, growth, dangers and deformities, rather than final disabilities as manifested in psychoses.

Habits or patterns of reactions in the individual can be changed, while end disabilities are largely permanent. Fifty-some varieties of bad habits among 900 manifestations in 226 children under six years of age indicate a large preventive work being carried out as a state effort in Massachusetts, Pennsylvania and Iowa. Guidance clinics, from New York to Los Angeles, have been added to the usual out clinics, as the result of the study of juvenile delinquency started in 1922. Community chests and more efficient management of charitable organizations are calling for more and more mental hygiene effort.

2. Doctor Myers wisely directs especial attention also to the second main objective, viz., the early modifications of mental growth trends where greater changes are possible. The study of juvenile delin-

quency leads to back-grade pupils in the schools. The study of problem children in the schools leads directly to the family, and especially to the parents. In the family the trail leads back to childhood, and early behavioristic trends. To place the burden of these trends on heredity is untrue and has been proven false by the experiment of changing the environment and management of the child and finding speedy changes in the behavior of the child. Consequently all mental hygiene efforts revert finally to the parents.

3. Mental hygiene recognizes the importance of alcohol, drugs, syphilis and infections in their damaging effects on the brain. But the field, especially neglected, and ineffectively cared for, is that of environment; modified by preventive measures against personality catastrophes; and by the importance of the axiom that the earlier the efforts, the greater the modification of the behavior of any living organism.

FOOD POISONING*

SOME EXPERIMENTAL ASPECTS

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FOOD poisoning, as it is understood today, is the result, directly or indirectly, of the contamination of food with certain bacteria. Clinically it may be classified as an intoxication. It is probably as old a condition as any of the diseases affecting the human being and consequently has been known by a much varied terminology.

TWO TYPES OF FOOD POISONING

The scientific worker generally recognizes two types of food poisoning. One type is due to the contamination of the food with the paratyphoid-enteritidis group or other bacterial organisms, either through the agency of a human or animal carrier or from the meat of an animal suffering from a specific infection with these germs. Subsequent incubation of the contaminated food through improper and insufficient cooking, refrigeration or storage, allows the bacteria to secrete, in their growth, a poisonous product, or, perhaps in the process of heating, certain products become soluble and evidently poisonous. The consumption of such food is followed within several hours by symptoms of nausea, abdominal pain, vomiting, prostration, diarrhea, and perhaps fever. Complete recovery within forty-eight hours is the rule.

The other type of food poisoning is known as botulism. It is due to the contamination of the food with a specific bacterium known generally as the *Bacillus botulinus*. This germ is found in the soil practically throughout the world. It exists in nature in the form of a spore and as such is not poisonous. When so-called nonacid or slightly acid foods, such as many vegetables, fish, and meat, are preserved by faulty and unsanitary methods, botulinus poisoning may occur. The symptoms usually appear within twenty-four to forty-eight hours after the consumption of the poisonous food. There may be marked muscular weakness, disturbances of vision, loss of ability to swallow and talk, constipation, rapid pulse and subnormal temperature, rarely any pain, and death from respiratory failure. This somewhat rare type of poisoning, so serious because of its high death rate, has apparently been eliminated from commercially canned foods. It is regrettable that home-canning methods antedate the present-day knowledge of botulism and that, with a few exceptions, no effort has been made to correct them. Only boiling for a sufficient length of time after removal from the glass jar or can before being served will make home-canned foods reasonably safe.

COMPARATIVE PROCEDURES IN TWO TYPES OF FOOD POISONING

It is deemed important to point out briefly in a table the different investigative procedures that are suggested in outbreaks and the clinical symptoms in both types of food poisoning. This paper, however, will concern itself only with the first type under discussion. This type, popularly known as ptomain poisoning, because of its relative statistical importance, has intrigued a number of investigators. Many of the factors operative in outbreaks, however, are experimentally and epidemiologically yet obscure.

BACTERIA CONCERNED IN OUTBREAKS

The generally accepted causative bacteria in food-poisoning outbreaks of the first type under discussion are the paratyphoid-enteritidis group. *B. enteritidis* was isolated by Gärtner [1] in 1888 in an outbreak due to meat. The source of the meat was an animal slaughtered because of its being ill from enteritis. Hübener,[2] Savage and White,[3] Spray,[4] and Geiger [5] have also recorded outbreaks due to this organism. Besides specific infections and possible carriers in animals, another source of *B. enteritidis* is the commercial rat viruses which are not infrequently used for the destruction of rodents in and around food establishments, especially bakeries and canneries. Health agencies have not generally recognized this possible source of contamination and taken steps to regulate their use. Of the specific paratyphoid group, outbreaks have been attributed to *B. paratyphosus A* and *B* in the United States by Geiger.[5] At this point one of the numerous difficulties as to classifying causative bacteria now arises, because of the terminology as to subtypes of *B. paratyphosus B*. Likewise, the term "Salmonella group" is often used to add to the confusion. Furthermore, Savage and White [3] refer to "Mutton and Derby types." Jordan [6] has attempted to classify the matter of types by using the term *B. paratyphosus B* "Schottmuller type" and limiting such a type as coming from human sources. Many investigators, however, classify another type of *B. paratyphosus B* "Aertrycke type" and whose source is presumably from animals. It is this organism *B. aertrycke* which is supposed to be the commonly causative bacterium in most outbreaks of food poisoning.

The other bacteria involved in, or thought capable of causing outbreaks, are *B. suipestifer, B. pullorum,* and *B. anatum*. In fact, Geiger, Ward, and Jacobsen,[7] in a study of the bacterial flora

* From the Hooper Foundation, University of California, San Francisco.

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